Secretary of Energy Ernest Moniz at Sandia . . .

National labs have big role to play

By Sue Major Holmes

ALL HANDS — Energy Secretary Ernest Moniz, at podium, addresses an all-hands meeting at Sandia on Tuesday afternoon, telling a full house at the Steve Schiff Auditorium that "We have work to do . . . and it's quite broad in its reach." Joining Moniz on the stage are, from left, Albuquerque Mayor Richard Berry, US Rep. Ben Ray Lujan, NNSA Sandia Field Office Manager Geoff Beausoleil, NNSA Acting Administrator Bruce Held, and Sandia President and Labs Director Paul Hommert. (Photo by Randy Montoya)

Energy Secretary Ernest Moniz says the national laboratories have an important role to play in two major policy areas stressed by President Barack Obama: his recently announced climate action plan and nuclear security.

Moniz pointed to Sandia's ongoing design of a large microgrid in New Jersey's key transportation corridor as part of climate work and the core contributions of Sandia, Los Alamos, and Livermore national laboratories to the nation's commitment to a safe, reliable stockpile.

Moniz, appointed as energy secretary earlier this year, spoke to a packed crowd Sept. 3 at the Steve Schiff Auditorium in an appearance videostreamed to Sandia/California. It was his first visit to Sandia as secretary, and gave him a chance to discuss a few specific research projects with the scientists behind them.

"We've never had a greater set of responsibilities in my view in terms of serving the president's very, very highest level priorities," Moniz said. "We have work to do . . . and it's quite broad in its reach."

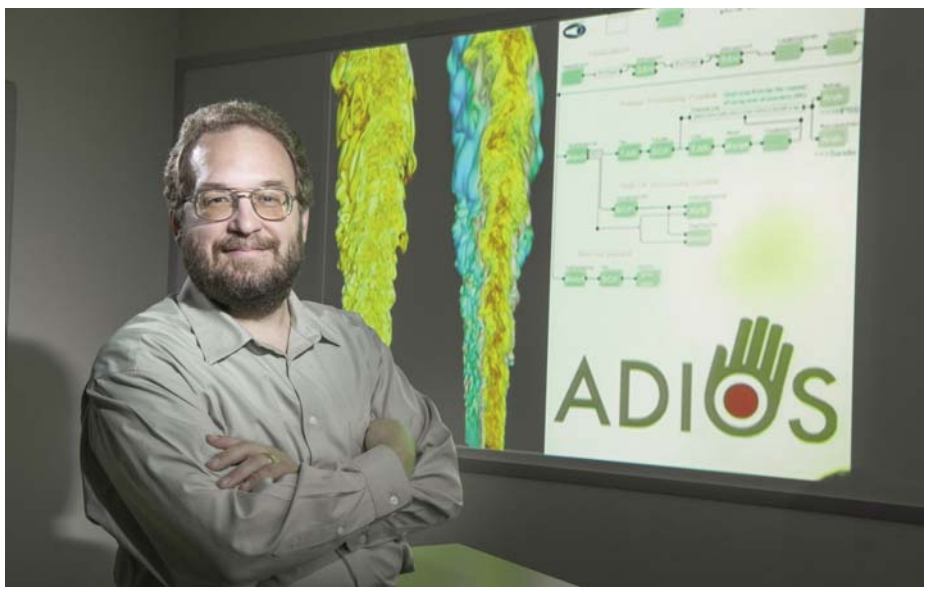
The laboratories, DOE, and NNSA can have a productive future by working together, he said.

In addition, they must collaborate on communications to make sure Congress learns about "the really incredible stuff that happens" at the labs and how they address very difficult problems in many different areas, he said.

Moniz, as part of a response to a question about the possible impact of budget uncertainties on Sandia, also said science and technology is the thread that unites the complex missions of DOE.

"The science and technology agency can't just stand still," but he cautioned that in an era of tight budgets the department needs to be very deliberate in defining its priorities.

Jay Lofstead is Sandia's fourth R&D 100 winner



A WINNER — Jay Lofstead (1423) is Sandia's fourth R&D 100 winner this year. His Sandia affiliation was inadvertently not listed in Oak Ridge's winning entry for the ADIOS code. Jay was one of the initiators of the technology. (Photo by Randy Montoya)

By Neal Singer

Jay Lofstead (1423) is the fourth Sandia winner of an R&D100 award this year. His Sandia affiliation inadvertently was not listed in Oak Ridge's winning ADIOS code entry. Jay was one of the initiators of that technology.

ADIOS, which stands for Adaptable Input/Output System, a high-performance input-output software that can access data from storage and from data streams. It was originally developed to help run fusion plasma codes, which typically must handle billions of particles in high-fidelity simulations. Since its inception, the code now has been used in supercomputer calculations involving combustion research, earthquake simulations, quantum physics, computational fluid dynamics, climate research, and weather forecasting.

It maintains adaptable, easy-to-use, and scalable I/O plug-ins across a variety of platforms. The software framework is designed to handle the input/output requirements of current and future "big data" applications, where efficiency and portability are a must.

Among its advantages are data staging methods that allow independent applications to run concurrently for memory-to-memory data exchange, thereby streamlining workflows. Potential applications lie in cloud computing and financial services.

R&D 100 awards focus attention on research ideas that have been put into use, in contrast with more typical science awards that honor pure research. Since 1976, Sandia has won 105 R&D 100 awards.

Sandia's three other winners this year (see *Lab News*, July 26) are Bruce Burkel, for the Membrane Project Lithography team; Mike Heroux, the Mantevo project; Cliff Ho and Cianan Sims, the Solar Glare Hazard Analysis Tool.

Sandia LabNews

Vol. 65, No. 16 September 6, 2013

Managed by Sandia Corporation for the National Nuclear Security Administration

Sandia National Laboratories

Research Challenges

'Trusted Systems and Communication' and 'First to High-Yield Fusion'

By Neal Singer and Sue Major Holmes

In the second presentation describing Sandia's new Research Challenges program, directors Tom Zipperian (2700 Neutron Generator Enterprise) and Jim Lee (1600 Pulsed Power Sciences) were on hand looking for researchers to help develop their respective Challenge areas of "Trusted Systems and Communications" and — put with unusual bravado for Sandia, the quiet lab — "First to High-Yield Fusion."

Duane Dimos, 1000 VP for Science and Technology, introduced the session by saying the research must be a "critical, vital, and integral component of Sandia's identity, purpose, and success."

Trusted systems have been part of programs at Sandia for decades, Tom said. "But now, we're increasingly attempting to develop national security products that work with high reliability against a new type of threat that is increasing exponentially: adversarial subversion."

He quoted from a January 2013 Defense Science Board Task Force Report, which read in part: "The US cannot be confident that our critical information technology systems will work under attack from a sophisticated and well-resourced opponent utilizing cyber capability in combination with their military and intelligence capabilities (a full spectrum adversary.)"

In a crisis, such opponents could attempt to lock the most important US defense systems.

"We have to ensure," Tom said, "that denial of service isn't implemented by threat partners."

Having stated the problem, he posed the research challenge: "The question is how to bound the challenge to an executable small set of problems and solutions that still have the possibility of a major impact?"

Today, systems are networked rather than standing alone, have more software than ever, and their components arrive from hundreds of suppliers.

(Continued on page 4)

Inside . . .

That's that

A couple of issues back, we reported Sandia's new Research Challenges initiative, which to my mind is one of the more exciting developments at the Labs in the 18-plus years I've been here. The idea is to provide longer-term support — five- to 10-year support — for cross-discipline, potentially game-changing research in key technical areas.

In introducing the initiative, Labs President and Director Paul Hommert said he found the proposal "immediately invigorating." The proposed areas for research include: Beyond Moore Computing, Data Science, Trusted Systems and Communication, First to High-Yield Fusion, Quantum Limited Detection, Cyber Resiliency, Multi-Physics and Multiscale Materials Knowledge to Create Engineered Solutions, Power on Demand, Embedded Annual Assessment, Resiliency in Complex Systems, and Integrative Biological Systems Analysis and Engineering.

A few days after that article came out (it was in the July 26 issue of the *Lab News*), I got a call from a retired Sandian, an individual who was very highly regarded during his career here. He had called to chat about an idea for a *Lab News* story (it was a good idea by the way) but then mentioned that, like me, he found the Research Challenges initiative to be inspiring and energizing. He noted that he'd been reading a new biography about Thomas Jefferson and that based on the insights he gained from his reading, he was pretty sure our third president would be gratified to see a great national laboratory commit itself to a bold new set of challenges. I was intrigued by the connection between Jefferson and Sandia's to a new generation of research. I asked my retired friend to send me an email expanding his thoughts. He wrote:

> Jefferson was a natural scientist who constantly pursued lines of inquiry that could lead to new discoveries. Nothing epitomizes that more than his pursuit of the Louisiana Purchase, despite the fact that the Constitution provided no such avenue for the country's chief executive to agree to such a measure. It literally 'rocked our world,' in today's vernacular.
> The other founding father who is even more highly recognized for his advancement of the sciences is, of course, Benjamin Franklin. It is this country's great fortune to have at least two amazing scientists counted among our Founders.
> Their intellects knew no boundaries, their scientific pursuits bent all known limits at the time, and their ability to communicate and persuade was outstanding. What better combination of attributes can you think of to characterize Sandia today and articulate its aspirations for tomorrow?

Well put, don't you think?

* * *

Speaking of Thomas Jefferson and Benjamin Franklin, have you ever heard that story about the time President Kennedy hosted a dinner for Nobel laureates of the Western Hemisphere at the White House? This dinner was in late April, by the way, prompting one media wag to dub the black tie affair as "the president's Easter egghead roll on the White House lawn." In his remarks to his distinguished and accomplished guests, Kennedy took time to mention that men of science played a key role in the nation's founding.

"I want to tell you how welcome you are to the White House," Kennedy said. "I think this is the most extraordinary collection of talent, of human knowledge, that has ever been gathered together at the White House, with the possible exception of when Thomas Jefferson dined alone.

"Someone once said that Thomas Jefferson was a gentleman of 32 who could calculate an eclipse, survey an estate, tie an artery, plan an edifice, try a cause, break a horse, and dance the minuet . . . [and] if he could have had his former colleague, Mr. Franklin, here, we all would have been impressed."

* * *

I guess I'm on a quotes kick here, but there was something John Kennedy once said that I'd like to pass along. No, not "Ich bin ein Berliner." Not "Ask not what your country can do for you." The quote I have in mind isn't quite as well-remembered, but in its own way and on a personal level, just as memorable. The set-up? Kennedy was at a press conference in Paris in June 1961 during an official state visit to France just a few months after he took office. His hosts, dazzled by the young president's glamorous and beautiful wife, were, like much of the rest of the world, totally caught up in the thrall of "Jackie Fever." Kennedy, a man always attuned to the moment, opened the news conference by quipping, "I do not think it altogether inappropriate to introduce myself to this audience. I am the man who accompanied Jacqueline Kennedy to Paris — and I have enjoyed it."

To my ear, that's pretty classy.

See you next time.

— Bill Murphy (505-845-0845, MS 1468, wtmurph@sandia.gov)

Sandian Nancy Jackson named American Chemical Society Fellow

By Stephanie Hobby

Sandia chemical engineer Nancy Jackson (6823) has been named a 2013 American Chemical Society (ACS) Fellow. The prestigious honor, given by the world's largest scientific society, is awarded to scientists who have demonstrated outstanding accomplishments in chemistry and have made important contributions to ACS.

SANDIA chemical engineer Nancy Jackson works in laboratories around the world to help ensure that chemicals are used safely and kept secure. She was recently named as a Fellow of the American Chemical Society. (Photo by Randy Montoya)

In 2007, she helped the US Department of State create the Chemical Security Engagement Program, and works closely with scientists worldwide, particularly in developing countries, to promote safe use of chemicals and keep them from falling into the wrong hands.

She is the manager of Sandia's International Chemical Threat Reduction program, leading a team that partners with chemistry labs around the world to ensure chemicals are handled safely and securely. Nancy's work has led to crucial programs to help laboratories in some of the world's most volatile regions manage their chemical inventories and secure their chemicals, as well as train future chemists and laboratory trainers in safe handling techniques. The programs teach chemists and chemical engineers the importance of personal protective equipment, maintaining working chemical hoods, chemical management, and physical security. The Sandia program's goal is to educate professors and those who will be training others in safety and security measures.

Nancy has been closely involved with the ACS for more than 34 years and served as its president in 2011. The ACS Board of Directors selected Nancy as a Fellow for her work in developing and contributing to international scientist-to-scientist programs sharing chemical safety and security with academia, industry and government in developing countries.

"Being named a Fellow of ACS means the world to me. So much of my professional life has included and benefitted from my involvement in this outstanding organization," Nancy says. "This is a tremendous honor."

Nancy is also a Fellow in the International Union of Pure and Applied Chemistry (IUPAC) and the American Association for the Advancement of Science (AAAS), which also awarded her the 2012 AAAS Award for Science Diplomacy.

ACS Fellows are selected based on excellence and leadership in two categories: science, the profession, education and/or management; and volunteer service in the ACS community. The 2013 Fellows will be recognized at an induction ceremony on Monday, Sept. 9, during ACS's 246th annual meeting in Indianapolis.

Sandia LabNews

Sandia National Laboratories

Sandia National Laboratories

http://www.sandia.gov/LabNews

Albuquerque, New Mexico 87185-1468
Livermore, California 94550-0969
Tonopah, Nevada • Nevada National Security Site
Amarillo, Texas • Carlsbad, New Mexico • Washington, D.C.

Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corp., for the US Department of Energy's National Nuclear Security Administration.

Bill Murphy, Editor **505/845-0845**
Randy Montoya, Photographer **505/844-5605**
Mike Janes, California site contact **925/294-2447**
Michael Lanigan, Production **505/844-2297**

Contributors: Michelle Fleming (Ads, Milepost photos, 844-4902), Neal Singer (845-7078), Patti Koning (925-294-4911), Stephanie Holinka (284-9227), Darrick Hurst (844-8009), Stephanie Hobby (844-0948), Heather Clark (844-3511), Sue Holmes (844-6362), Nancy Salem (844-2739), Jennifer Awe (284-8997), Cathy Ann Connelly (284-7676), Tim Deshler (844-2502), Jim Danneskiold, manager (844-0587)

Lab News fax **505/844-0645**
Classified ads **505/844-4902**

Published on alternate Fridays by Media Relations and Communications Dept. 3601, MS 1468

LOCKHEED MARTIN

Lab News Reader Service

The *Sandia Lab News* is distributed in-house to all Sandia employees and on-site contractors and mailed to all Sandia retirees. It is also mailed to individuals in industry, government, academia, nonprofit organizations, media, and private life who request it.

Retirees (only):

To notify of changes in address, contact Benefits Dept. 3332, Customer Service, at 505-844-4237, or Mail Stop 1021, Sandia National Laboratories, Albuquerque, NM 87185-1021.

Others:

To receive the *Lab News* or to change the address (except retirees), contact Michelle Fleming, Media Relations and Communications Dept. 3651, 505-844-4902, email meflemi@sandia.gov, or Mail Stop 0165, Sandia National Laboratories, Albuquerque, NM 87185-1468.

Employees:

To address concerns regarding delivery of the *Lab News* to your facility, call Mail Services Team 10268-4, at 844-3796. At Sandia/California contact the Mail Room at 925-294-2427.

Web users:

The *Lab News* is on the external web at www.sandia.gov/LabNews. *Lab News Interactive*, accessible on the internal web, is at: www-irn.sandia.gov/newscenter/interactive.

Retiree deaths

Dorcas Entley (age 90) . . . . . May 2
Arthur E. Jones (94) . . . . . May 11
Eusebio Montano (89) . . . . . May 16
Alfred J. Quant (92) . . . . . May 24
Marvin J. Becktell (92) . . . . . May 24
Jesse L. Getz (94) . . . . . May 25
Joanne Pendall (83) . . . . . May 26
Miller N. Cravens Jr. (82) . . . . . June 3
Theresa C De Baca (86) . . . . . June 4
James M. Kelly (85) . . . . . June 5
Jerry R. Brooks (73) . . . . . June 8
Bruce Langford (90) . . . . . June 8
Robert E. White (87) . . . . . June 18
Thomas Martin (78) . . . . . June 19
William N. Caudle (83) . . . . . June 20
Kenneth W. Henry (74) . . . . . July 3
Jack Schendel (63) . . . . . July 3
Robert V. Peet (84) . . . . . July 9
F.G. Gabaldon (88) . . . . . July 13
Paul Metoyer (75) . . . . . July 15
John Mulligan (84) . . . . . July 15
Robert A. Ware (87) . . . . . July 21
Francis A. Stibick (69) . . . . . July 24
Zachary Ortiz (85) . . . . . July 29
Thomas Casaus (57) . . . . . July 31
Evelyn Eileen Chaney (78) . . . . . July 31
Audilio Tenorio (76) . . . . . August 1
Florencio Baca (97) . . . . . August 8
Elizabeth Garcia (88) . . . . . August 9
W. B. Pepper (87) . . . . . August 14

Low-temperature combustion enables cleaner, more efficient engines

By Mike Janes

As demand climbs for more fuel-efficient vehicles, knowledge compiled over several years about diesel engines and a new strategy known as "low-temperature combustion" (LTC) might soon lead auto manufacturers and consumers to broader use of cleaner diesel engines in the United States.

The journal *Progress in Energy and Combustion Science* published a summary of recent research on diesel LTC in a review article titled "Conceptual models for partially premixed low-temperature diesel combustion." The article, prepared by Mark Musculus, Paul Miles, and Lyle Pickett (all 8362), provides what the authors say is a necessary science base for auto and engine manufacturers to build the next generation of cleaner, more fuel-efficient engines using LTC.

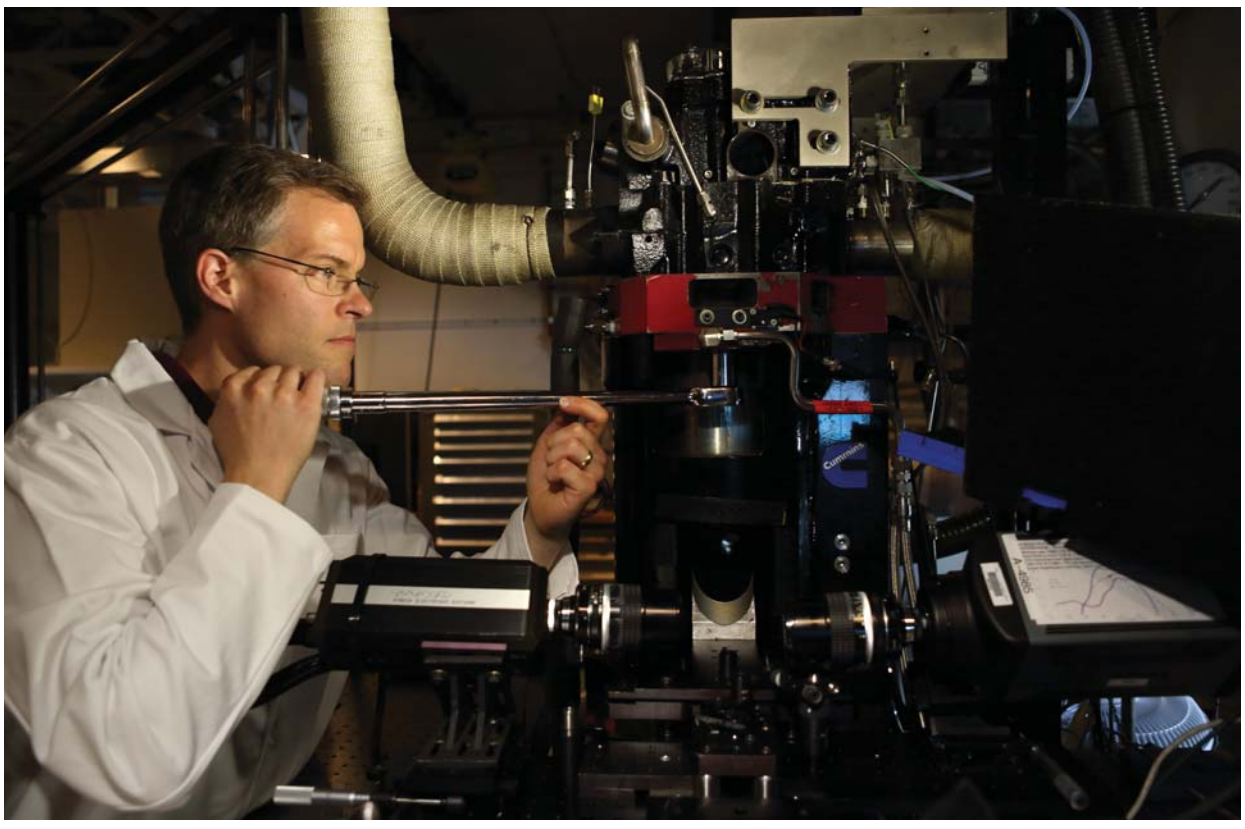
"Diesel engines are generally more efficient than gasoline engines," says Mark. "When long-haul truck drivers are burning thousands of gallons per year for cross-country freight runs, or when consumers are faced with high fuel prices, a more efficient engine becomes very important." The increased efficiency also translates into lower carbon dioxide (CO_2) emissions, which are a major driver of global climate change.

Though diesel engines are more efficient, they still have serious pollutant emissions problems.

Gasoline-powered engines have become ever cleaner by inserting better and better catalytic converters between the engine and the tailpipe to clean up pollutants created by the engine.

But the same catalytic converter that works so well for gasoline engines will not work for diesel engines. Other more complicated exhaust aftertreatment systems are deployed in modern diesel engines, but engine designers and operators would like to avoid the cost and efficiency penalties imposed by those systems.

"It would be great to find some other way to clean up the diesel engine if we want to enjoy its full efficiency advantages," explains Mark, "and LTC might just be the solution."



USING NEW OPTICAL DIAGNOSTIC TECHNIQUES, Mark Musculus (8362) and his colleagues identified the sources of key pollutants from LTC engines. Understanding how LTC works as a combustion technique may lead to broader use of cleaner diesel engines. (Photo by Dino Vournas)

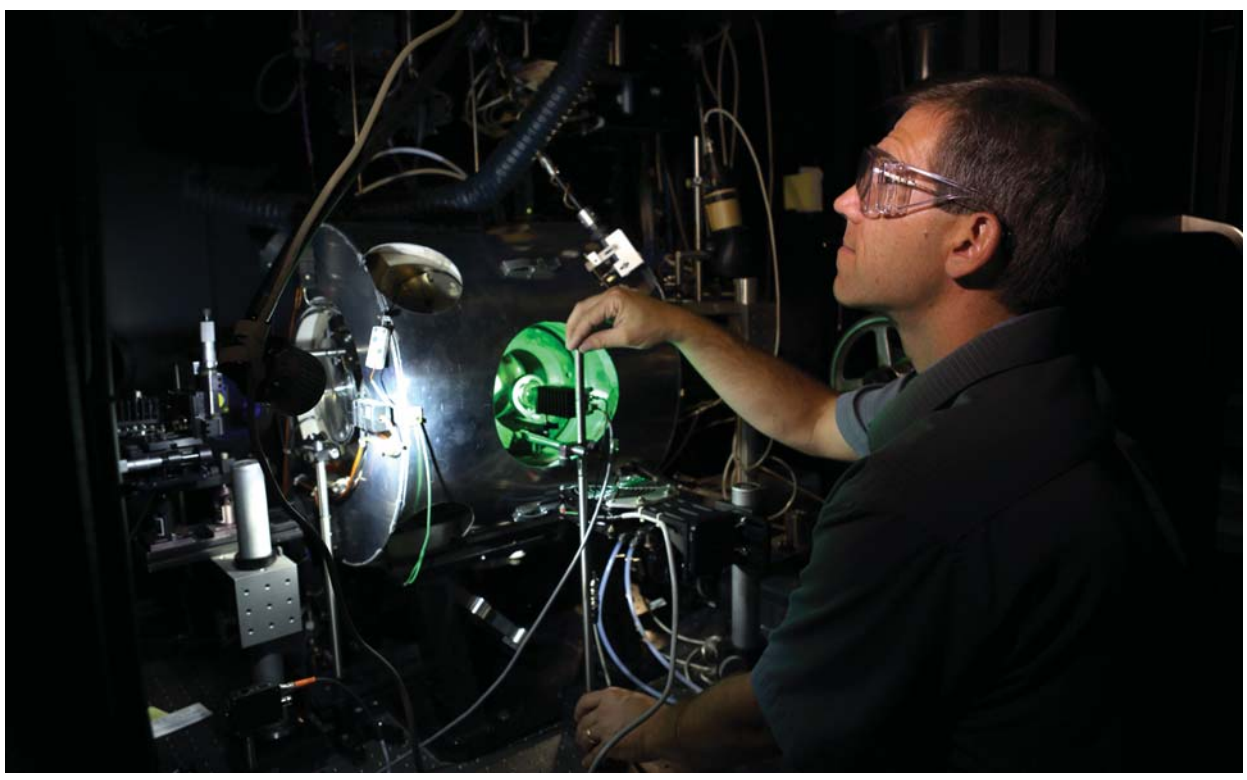
Sandia CaliforniaNews

Low-temperature combustion reduces NOx and smoke

Largely due to landmark work in the 1980s and 1990s at Sandia's Combustion Research Facility (CRF) in California, researchers already understand how pollutants are created during conventional diesel combustion. Details of how conventional diesel combustion works — research that took advantage of special optical engines and diagnostics with lasers and scientific cameras to probe the combustion processes — were consolidated into a much-referenced conceptual model developed by Sandia's John Dec in 1997.

The laser-based diagnostics showed that one pollutant, smoky particulate matter, or PM, was formed in regions where fuel concentrations were too high. Another serious pollutant, nitrogen oxides, or NOx, arose from a high-temperature flame inside the engine. NOx emissions are not only toxic, but once released into the atmosphere and exposed to sunlight, they react with other pollutants to create ground-level ozone, or smog.

LTC addresses the NOx emissions by recirculating some of the exhaust gases expelled by a diesel engine back inside the engine, where they absorb the heat from combustion. With this dilution effect, the combustion temperatures are lower so NOx formation is significantly reduced. The other part of the LTC strategy, Musculus said, is to spray in fuel earlier in the engine cycle to give the fuel more time to mix with air before it burns. LTC thereby avoids much of the fuel-rich regions that lead to PM as well as the high temperatures that lead to NOx.



USING ADVANCED TOOLS such as the diesel simulation facility shown here, researcher Lyle Pickett (8362) and others can determine the effects of injector, in-cylinder, and fuel parameters on LTC/advanced diesel combustion emissions processes. The research helps to set parameter limits for generating low-emission, mixing-controlled combustion conditions. (Photo by Dino Vournas)

Breakthrough measurement identifies sources of other pollutants

While LTC helps reduce PM and NOx pollution, it is not without its own problems. While NOx and PM are reduced, other pollutants go up, including carbon monoxide (CO) and unburned hydrocarbons (UHC) from the fuel. Both are not only toxic, but also result in a loss of fuel efficiency.

The CRF research team identified the sources of these emissions from LTC engines using new optical diagnostic techniques. In a breakthrough measurement, researchers used two-photon laser-induced fluorescence to map in-cylinder CO, a difficult measurement that had never been achieved inside a diesel engine.

Detecting UHC is also problematic because many different chemical species make up the overall UHC, and their composition evolves during combustion. So, instead of detecting UHC directly, researchers used laser-induced fluorescence of other markers of combustion, such as formaldehyde and hydroxyl, to observe and understand the chemical processes that lead to UHC. The combined measurements showed that the fuel that ended up near the fuel injector was "overmixed" — there was too much air and not enough fuel, so the fuel couldn't burn to completion, leading to the CO and UHC in the exhaust.

With this new understanding of UHC and CO emissions, Mark and former Sandia post-doctoral researcher Jacqueline O'Connor looked for a way to increase the fuel concentration in that area. One way, they discovered, is to add post-injections, which are smaller squirts of fuel after the main spray, which add more fuel in just the right area. With the post-injections, the zone of complete combustion extends over a larger region, leading to lower UHC and CO emissions while increasing efficiency by making sure that less fuel is wasted by not even burning it.

Mark and his colleagues, through their latest research paper, hope to communicate the details of how LTC works to the broader engine research community. "This is the kind of scientific research and data that engine designers, who help to guide our research, tell us they need so that they can build the kind of fuel-efficient diesel engines that consumers will want," he says.

The Sandia work was completed for the US Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE).

TITANS serves up challenging national security work with a side of fun

By Nancy Salem and Heather Clark

Keilan Jackson was looking for real-world experience when he shopped for an internship for the summer of 2013. The Arizona State University computer science junior had completed other intern stints where his work was never put to use.

From several options, he chose Sandia's Technical Internships to Advance National Security, or TITANS, program, which offered a focused internship in one of three technical tracks with exposure to national security challenges.

"It's been amazing," he says. "The important work is what's different for me. It's interesting and not trivial. What I'm doing at Sandia will be carried on and used."

Keilan and other TITANS interns are setting up a proof-of-concept system for seismic data monitoring using Sandia-developed research and various software technologies. "We communicate continuously about what we're doing and what needs to be done," Keilan says. "We work in an open space and are able to help each other out. The other interns are fun and smart. We make progress every week."

TITANS was launched in the summer of 2012 as an umbrella program over three Division 5000 internship institutes: the Center for Analysis Systems and Applications (CASA, 5500); the Center for Cyber Defenders (CCD, 5600); and the Monitoring Systems and Technology Intern Center (MSTIC, 5700). The CCD internship institute was established in 2001 and MSTIC and CASA are newer.

"We created TITANS to take our internship experience to the next level," says Marcus Chang, manager of Next Generation Monitoring Systems Dept. 5563 and manager of the CASA program in TITANS. "We put a lot of effort into making it as fulfilling, interesting, and fun as possible."

A hiring pipeline

TITANS interns — about 30 each in CCD and MSTIC, and 10 in CASA — are exposed to all three institutes, and work in a wide range of technical fields dominated by computer science and engineering, and electrical and mechanical engineering.

They have open workspaces where collaboration is encouraged. Each student has a Sandia staff mentor, and the program offers events such as tours of key Labs facilities and social gatherings. "They can ask questions and build networks and relationships with peers," Marcus says. "With a larger population of interns it's a more enjoyable experience."

TITANS — From left, interns Keilan Jackson, Cedric Carter, Keith LeGrand, and Regina Eckert say collaborating on meaningful, real-world projects made their Sandia experience fulfilling. (Photo by Randy Montoya)

He says TITANS offers the three institutes efficiencies in recruiting, managing, and hiring interns. "We have a team working together instead of each institute separately doing the same things," he says. "We work together to place top students into institutes within TITANS."

In addition to Marcus, the TITANS team includes Han Lin (5629), who heads the program for CCD, and MSTIC leader Mike Skaggs (5747). Program coordinators are Lori Belcher (5747), Vantrice Fuentes (5563), Cherri Porter (10656), and Tommie Kuykendall (5624).

The program is funded through the Div. 5000 People Initiative and is designed to bring topnotch employees to Sandia. "It's an internship pipeline for strategic hiring, geared to turning interns into full-time employees," Marcus says. "The interns are exposed to what it's like to work at Sandia and what the national security challenges are facing the nation. It allows them to understand why Sandia is such a unique place to work.

"The work is more complex and meaningful than at other places. They take that back to school and talk to their friends. It builds Sandia's reputation and helps us recruit better people."

About a dozen TITANS interns have been hired as full-time employees or into the Critical Skills Master's Program (CSMP), under which they are paid to earn a master's degree as employees of the Labs. New hires can stay in the group they interned with or join another. "An intern might come and do interesting work but find out about another group that would be a better fit," Marcus says. "Our goal is to get them into Sandia and find the place where they are most passionate. That's where they will do well."

Hit the ground running

Lori says TITANS benefits Sandia in many ways. "We learn a lot from our interns," she says. "When a new generation comes in they bring a wealth of knowledge and a new culture to the Labs. They bring fresh eyes and different toolsets to the challenges."

Most interns spend a summer at Sandia, and many re-apply to come back the following summer. About a dozen are year-round, either telecommuting or from the University of New Mexico or New Mexico Tech. There are typically more than 500 applicants for the TITANS positions each year.

Marcus says the interns' assignments are set up in advance so they hit the ground running, working alongside Sandia technical staff. "It's a unique environment," says CASA mentor Ben Hamlet (5563). "We want to give our interns real experience to allow them to know if it's an area they want to work in long term."

Keilan joined CASA in early May on a project to create a seismic event monitoring pipeline using service-oriented computer architecture. Raw seismic data from earthquakes, explosions, and other events comes into the processing pipeline from stations around the world. Keilan and colleagues are building a software framework to interpret the data through event detection, location, and association.

The work supports Comprehensive Nuclear Test Ban Treaty (CTBT) monitoring. "Our research helps the nation's ability to monitor for nuclear detonations," Keilan says.

Cedric Carter came to the CCD as a cybersecurity intern from North Carolina A&T State University, working on a secure computer system. "The cyber labs at Sandia are among the biggest in the country, and that attracted me," he says. "We're changing the paradigm for computer systems to make them more secure and resilient to malware."

He says it feels good to do meaningful work. "We're making a difference to national security," he says. "We do real-world, cutting-edge research. The collaboration is amazing. I'm a strong believer that collaboration promotes productivity."

Pride and respect

Keith LeGrand, an aerospace engineering major from the Missouri University of Science and Technology, spent the summer at Sandia and is applying to CSMP while finishing his senior year. He is a year-round TITANS intern in the MSTIC program, helping to design a power module that will be on board a Global Positioning System (GPS) satellite.

"I had other internship offers but TITANS was more in line with what I want to do," Keith says. "I'm really interested in research and development, being on the edge and exploring new things. You see the R&D 100, and Sandia always has three or four awards. I wanted to be a part of that."

Keith says he fell in love with the Sandia culture. "The way people interact is amazing, and the incubator setting with collaborative environments and different disciplines is very rewarding. There's always somebody to help if you get stuck on a project," he says.

Sandians take pride in their work and respect each other, Keith says. "Everybody is here to make a difference," he says. "I get the best of both worlds, spending half my time with other interns in the incubator and the other 50 percent working with my mentor and full-time staff."

Year-round intern Regina Eckert, an Albuquerque native and junior in electrical engineering at the University of New Mexico, works in MSTIC on ground-based seismic monitoring.

"You might think all seismic events look the same, but they don't," she says. "Each event, such as an earthquake or mining explosion, has a waveform. Our job is to correlate the waveforms and identify templates for specific events to speed up the Comprehensive Test Ban Treaty analysis. It can cut the analyst workload significantly."

Regina says she appreciates the educational opportunities offered by Sandia. "There are a lot of really nice advantages to working here," she says. "And the national security mission is important."

Keith says that coming into the internship he didn't view Sandia as a long-term career prospect. "My plan was to go test every company I thought could be a possibility. I had no intention of committing," he says. "But that changed when I got here. I saw this would be a great place to work. TITANS let me find my place in the company."

More information about the TITANS program, including a list of job openings, is available at **http://titans.sandia.gov**.

Research

(Continued from page 1)

Tom said that given these conditions, the Trusted Systems challenge team is still trying to define the scope of the work and how to proceed to have the greatest impact. He used neutron generators as an example, pointing out that Sandia is responsible for neutron generators from design to production to retirement. The Labs already works to prevent defects, and Tom suggested it could build on that work to also prevent subversion.

"There are five core project areas in nuclear weapons to protect," he said, "and we're looking for strategies for the near, mid and long term — 1, 2-3, and 4-8 years," he said.

"At least," he finished, "that's my story and I'm stickin' to it."

First to High-Yield Fusion

Jim Lee, director of Pulsed Power Sciences Center 1600, recalled seeing a demonstration billed as fusion at the 1964 New York World's Fair when he was a child. He learned later it wasn't a significant amount of fusion, but told the audience his dream is that a child today will be able to remember the moment controlled fusion was achieved in a laboratory.

He believes Sandia is at a point where it can make the advances necessary to achieve that goal using new technology, new ideas, and new tools. The new technology is the linear transformer driver, the new idea is magnetized linear inertial fusion (MagLIF), and the new tools are better experiments and diagnostics, Jim said.

He also outlined the proposed Short Pulse Accelerator and Reactor Center, or SPARC, that in the future would replace Sandia's Z machine, now the largest pulsed power facility in the world. The goal is to have SPARC in operation by 2030, Jim said.

In answer to the question of why Sandia should do this work, Jim said, "Because we can!" and followed up with, "We are the science lab and others will have to get used to that." The assertion was greeted by the audience with laughter and applause.

Each Research Challenge introductory session is followed by a workshop so researchers can present ideas, collaborate, and help focus that particular challenge.

Researcher Amalie Frischknecht finds CINT a bountiful garden of ideas

By Neal Singer

Beyond Amalie Frischknecht's (1814) pleasant, light-filled office in the Center for Integrated Nanotechnologies (CINT), a lively sparrow hops on an outside window ledge.

She says to her visitor, "CINT is one of the best places to do research at Sandia."


AMALIE FRISCHKNECHT

One might be deceived by her unalloyed pleasure in her location into thinking she was just starting out.

Then she gives a more practical reason for her happiness: "If we're doing good research with a CINT user, we can sustain that research for a long period of time to hopefully heighten its impact, rather than stopping work on an interesting project after only two or three years and proposing something entirely different."

A check of her resume shows that extended periods of concentration and collaboration aren't just a naive hope for Amalie but an accomplished fact. The theoretical physicist, who graduated with a doctorate from UC Santa Barbara in 1998, has given 32 invited talks and published 49 papers, almost all on fundamental aspects of a subject she obviously has been considering for many years: polymer physics.

"I find it easier to wrap my brain around molecular phenomena rather than, say, quantum physics," she said. "Polymer physics is a very large field and I've looked at a subset of it, based on what Sandia is interested in and where I can find collaborators. I have pursued polymer physics for most of my professional life."

But rather than relentlessly investigate one aspect of the field, she feels more comfortable working in a garden of ideas. Which ideas germinate depend on two factors: Is there the money to water a particular seed, allowing time to pursue it further, and is there an interested experimentalist who can move forward with her?

She provides models for experimentalists to test, and sometimes her simulations provide physical insights that experimentalists with the best equipment can't find.

A number of plants in her garden show signs of flowering. With Karen Winey — a CINT user and researcher at the University of Pennsylvania — Amalie is attempting to find a better substitute for the solvent ethylene carbonate used in lithium batteries.

"Ethylene carbonate is a good conductor, but it's flammable," she says. "People would like instead to use ionomers — polymers with ions attached to them. We know that though they are poor conductors, they're safe. The question to us is how to make them better conductors."

Discussing matters with Winey at conferences over the years since 2008 — mostly the APS March meeting and the Gordon Conference on polymers — Amalie applied for and received an LDRD in FY2010 titled, "Ion Transport in Ionomers for Energy Storage." The LDRD allowed a team of Sandia staff and postdocs to investigate the ionic clusters in ionomers in detail.

"It was thought that negative ions attached to the polymer tend to cluster with the positive lithium ions, and these clusters could reduce the charge-carrying capacity of the polymer," she says. "We asked: If we modify the shape of the polymer, how does that affect the clustering that takes place between the negative and positive ions?"

The positive ion may sit on the negative ion like a rider on a horse and move "slowly like molasses," she says. Or the negative ions may function with the positive ones like a roller derby team, passing them forward, a much more rapid process. The question is, "Can you design the polymer to speed up the process? Do you space it with 10 carbons or 100? Space it further off the backbone? Or use a different kind of polymer?"

Each simulation of a new polymer shape takes a couple of months on Sandia's Red Sky supercomputer, using 16 to 32 processors. So it took about two years to identify the characteristics of 22 polymer variations.

Among other results, the work should end a controversy over the shape of the ionic aggregates in the ionomers. "People thought that the ionic aggregates in ionomers were spherical. We've shown that they tend to be stringy-shaped. When you're trying to understand the mechanism of how lithium ions move along a polymer, the shape of these clusters clearly would influence that movement. A stringy ionic aggregate can move ions better."

Amalie won an Employee Recognition Award for leading this work, which was first published in *Physical Review Letters*, with follow-on work by the team published in four other journals. Further research on ionomers is continuing as a CINT user project. "We're working on three more papers right now," says Amalie.

A second project she's pursued since 2007 involves making stable dispersions of gold nanorods in a polymer film. "We don't want the rods to clump up as we grow the film." Amalie and CINT user Russell Composto, also from the University of Pennsylvania, believe that such a film could have "nice optical properties, if we could control the spacing of the gold nanorods." The film, used as a sensor, could alter the resonant frequencies of light passing through it if a particle landed between the rods.

"Years ago," she says, "I did some calculations that were interesting to Russ, about nanorods in polymers. He was actually doing it. We said, 'Let's work together.'"

Assistant Secretary for Nuclear Energy Peter Lyons visits Sandia

Briefed on wide range of Labs' nuclear energy-related research

DURING HIS AUG. 16 VISIT to Sandia/New Mexico, DOE Assistant Secretary for Nuclear Energy Peter Lyons was briefed on a wide range of Sandia research supported by the department's Office of Nuclear Energy. After being welcomed by Executive Host Steve Rottler, Lyons toured Sandia's Brayton Laboratory, the Cylinder Boiling Laboratory, the Geotechnology Laboratory, and other facilities. In the photo here, Steve (left), Lyons, and Gary Rochau, manager of Advanced Nuclear Concepts Dept. 6221, with Paul Shoemaker, senior manager in Defense Waste Management Programs Group 6210 in the background, discuss the Supercritical CO_2 Brayton Cycle, a breakthrough energy conversion technology. (Photo by Lloyd Wilson)

Study could help improve nuclear waste repositories

YIFENG WANG (6222) examines a clay sample from South Dakota as student intern Jessica Kruichak (6222) prepares clay materials for iodide sorption experiments. A team of Sandia researchers is working to understand how fast iodine-129 released from spent nuclear fuel would move through a deep clay-based geological repository. (Photo by Randy Montoya)

By Sue Major Holmes

Here's the problem faced by a team of Sandia researchers: figuring out how fast iodine-129 released from spent nuclear fuel would move through a deep clay-based geological repository.

Understanding that process is crucial because countries worldwide are considering underground clay formations for nuclear waste disposal, since clay offers low permeability and high radionuclide retention. Even when a repository isn't sited in clay, engineered barriers to improve waste isolation often include a compacted buffer of bentonite, a common type of clay.

Iodine-129, a radioactive isotope with a half-life of 15.7 million years, is an important fission product in spent nuclear fuel and a large contributor to the predicted total radiation dose from a deep geological repository. So even a small improvement in the ability of clay to retain iodine-129 can make a difference in total dose predictions.

Some evidence indicates weak interaction between clay and iodide, a negatively charged predominant chemical species of iodine in geologic repositories, says Yifeng Wang (6222), who leads the radionuclide-clay interaction study. Computer models haven't been able to adequately explain clay's chemical behavior with iodide, and the mechanism is difficult to study because the faint interaction is easily masked by measurement uncertainties.

"It seems there's some kind of previously unrecognized mechanism that accounts for that kind of interaction," says Yifeng, co-principal investigator for the Laboratory Directed Research and Development project now in its third and final year.

His team concluded the interaction, often disregarded as experimental noise, is real and that there might be engineering ways to improve clay's ability to retain iodide.

Sandia team focuses on clay structure

The team —Yifeng and former co-principal investigator Andy Miller, who recently left Sandia; lab technician Hernesto Tellez; and year-round interns Jessica Kruichak and Melissa Mills (all 6222) — developed experiments with different clays, focusing on their structural characteristics. Past studies of iodide retention in clay concentrated on bentonite. Yifeng's team instead studied several different clays, five with the same type of layered structure as bentonite.

Although industries are accustomed to using the plentiful and oft-studied bentonite, the team's experiments show other clays have higher radionuclide retention capability and might isolate spent fuel waste better. Kaolinite had the best iodide retention of the five clays with layering properties. "So we can say our work can help us select a better clay material or a combination of clay materials," Yifeng says.

Team members believe they discovered a mechanism for iodide-clay interactions that allows more accurate prediction of iodine-129 movement in a geologic repository. The finding was presented in May to the International High Level Radioactive Waste Management Conference in Albuquerque and was published in the conference proceeding.

The experimental data indicate iodide directly interacts with clay interlayer sites. That raises the question of how negatively charged iodide gets into negatively charged interlayer sites, since like charges repel each other, similar to magnets of the same polarity. "So that contradicts the conventional concept," Yifeng says.

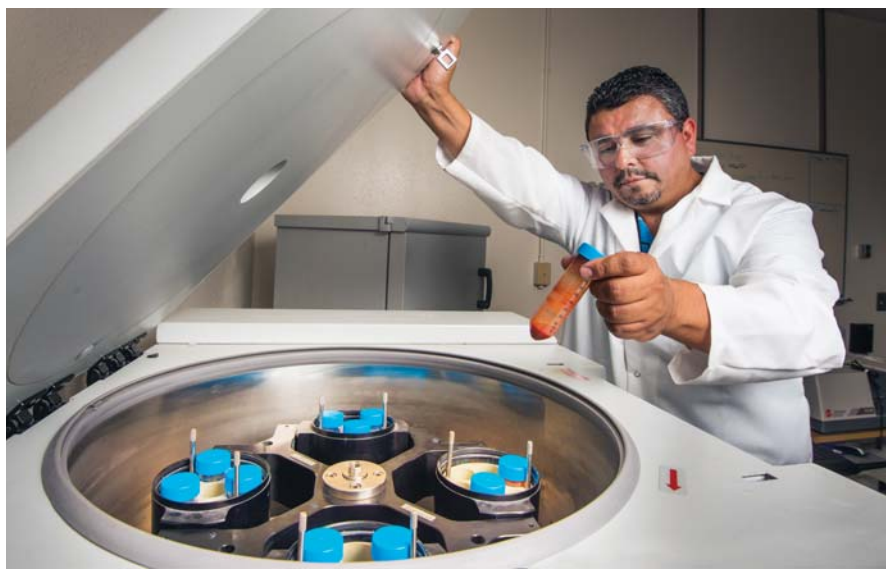
The team got clues about what was going on by studying the problem at the nanoscale, 100,000 times smaller than the diameter of a human hair. At that scale, Yifeng says, the property of water changes in a way that enhances the pairing of ions.

Conclusion: Ion pairing explains iodide reaction with clay

Ion pairing explains how iodide reacts with clay and moves into the pores despite the fact both iodide and clays are negatively charged.

The team postulates that iodide pairs with positively charged sodium to create a neutral ion pair. That occurs because of the enhanced ion association capability of water trapped in nanometer-scale clay interlayers, resulting in a pairing that helps iodide move into the interlayer by minimizing electric repulsion, Yifeng says.

Clay is densely compacted when it's used as a barrier and can swell as it contacts with water. "That's why people use clay materials and compact it," Yifeng says. "It's a good engineered barrier to isolate radionuclides."



SEPARATING SOLUTIONS — Lab technician Hernesto Tellez (6222) uses a centrifuge to separate solutions from clay particle suspensions for ion chromatographic analysis. (Photo by Randy Montoya)

Retention properties increase with compaction, which makes the pores smaller, he says. "That's another way to increase the effectiveness of clay materials," he says.

But Sandia's study also suggests measurements in labs have not been as accurate as they could be. Usually researchers break up samples before they measure the solvency of a specific material. "We show actually the nano-pore confinement makes a big difference," Yifeng says. "That means what you measure in the lab most of the time is not representative of an actual compacted material. The compacted material may in fact give you better retention."

54 individuals, 69 teams

2013 Employee Recognition Awards program honors teams, individuals for exceptional contributions

Sandia's prestigious Employee Recognition Awards are presented to individual employees and teams nominated by their peers and chosen by a division selection committee with final approval by the division VP for their accomplishments during the past year.

The ERA winners are honored for their exceptional contributions to Sandia mission success to underscore the importance placed on individual and team contributions. ERA winners are honored for their exceptional service, leadership, technical accomplishments, or teamwork.

Sandia's ERA program carries on a tradition established in 1994. Employee Recognition Night, held this year at Tamaya Resort on Aug. 17 and hosted by Sandia's executive management and Lockheed Martin, is an annual event held for the honorees and their guests.

In this year's ERA program booklet, Labs President and Director Paul Hommert wrote, "As we celebrate, I know that you will remember that your achievements are part of the Laboratory-wide effort contributed by every member of our workforce to provide exceptional service to the nation. We are proud of you and grateful for your excellent work."

Not pictured among individual winners: Lonnie Atencio (98), Malcolm Carroll (1725), Mark Kiefer (1659), Daniel Peacock (2666), Stephanie Salinas (4143), and Richard Scarine (2915)

Mark Crawford
10265

John DeBassige
433

Amanda Dent
2722

Janelle Edmister
5517

Barbie Finley
8527

Lynn Fitzpatrick
4251

Mickey Fitzpatrick
3333

Kristine Dawn Freitas
8522

Individual honorees

Tyrel Abshire
2998

Andrew Armstrong
1123

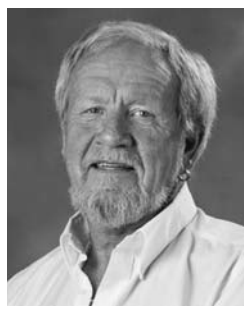
Mary Kay Austin
215

Adam Brewer
5572

Cecilia Brown
754

Gerald Clark
6623

Henry Coakley
5349



David Cole
5434

Seshadhri Comandur
8966

Terry Cooper
4120

Team honorees

Executive Support Division

Assurance Maturity Assessment (AMA) and Improvement Team

The AMA team conducted coaching and improvement activities, followed by an assessment of 14 different management entities that demonstrated significant improvement in assurance practices.

Team members: Mary C. Nation, John A. Campisi, Barbara A. Boyle

The W78 / W87 Independent Weapon Assessment Program Abnormal Mechanical / Thermal Analysis Team

For technical excellence and dedicated teamwork in delivering timely results to the Independent Weapon Assessment Program for customer, Paul Hommert, Laboratories Director.

Team members: Raymond J. Dukart, John L. Tenney, Nisa N. Brown, Jason Pul, Jeffrey L. Dohner, Henry R. Apodaca, Arne S. Gullerud, Lawrence C. Sanchez, Bonnie R. Antoun, Pandelis Lycou, and Matthew A. Spletzer

Division 1000

Acoustic Source Inversion Capability Team

Recognized for developing a new acoustics computational capability to simulate vibration environments and design qualification tests for the B61-12 and RVs/RBs.

Team members: Timothy Walsh, Miguel Alejandro Aguilo Valentin, Garth M. Reese, Eric Carl Stasiunas, Clark R. Dohrmann, David M. Day, Michael Ross, Jerry W. Rouse, D. Gregory Tipton

Beryllium Liner Dynamics Team

For designing, executing, analyzing, and publishing high-quality experimental data on magneto-Rayleigh-Taylor instability growth in initially solid beryllium liner implosions on Z.

Team members: Grafton Kincannon Robertson, Matthew Martin, Ryan James Kamm, Ryan D. McBride, Stephen A. Slutz, Raymond W. Lemke, Briggs W. Atherton, Michael E. Cuneo, Jean-Paul Davis, Dawn G. Flicker, Mark Herrmann, Christopher Jennings, Mike R. Lopez, Charles Nakhleh, Kyle Peterson, John L. Porter, Gregory A. Rochau, Dean C. Rovang, Mark E. Savage, Adam B. Sefkow, Daniel Sinars, Ian C. Smith, William A. Stygar, Roger A. Vesey

Dakota Development and Support Team

For demonstrated success in transforming Dakota to a production computational tool in support of Sandia's core mission areas and a growing external customer base.

Team members: V. Gregory Weirs, Laura Painton Swiler, Dena Vigil, Kenneth Hu, Mohamed Salah Ebeida, Brian M. Adams, John Davis Jakeman, Michael S. Eldred, George Edgar Orient, Keith Dalbey, Jim Stewart, William J. Bohnhoff, Patricia Hough, Lara Bauman, Ethan Chan

Gas Puff Z-pinch Experiments on the Z Facility

For providing the first in-house Sandia capability to design, characterize, and qualify gas puff nozzles used on the Z facility for X-ray source experiments.

Team members: Christopher Speas, Christopher Jennings, John Mckenney, Jose Manuel Villalva, Drew Johnson, Derek C. Lamppa, Eric Wayne Breden, Amy Renee Laspe, Jeffrey K. Georgeson, Brent M. Jones, Stephanie B. Hansen, Keegan Paul Shelton, David Ampleford, Adam York, Gabriel Olivas, Thomas D. Mulville, Michael Jones, Thomas Strizic, Owen Johns, Michael Alex Sullivan, David E. Bliss, Paul C. Cunningham, Gary J. Denison, Robert Allan Gunther, Marc Ronald Lee Jobe

Heavy Isotopes Disposition Project Team

This team created unique processes, overcame obstacles, found re-use options for Americium, Curium, and Neptunium materials instead of disposal, reducing corporate risk and saving money.

Team members: Randell Lain Salyer, David Siddoway, Michael John Salazar, Michael Starr, Paul Dixson, Shelly Ann Siddoway, Michael A. Torneby, Jonathan R. Wickliffe, Mitchell Callahan, James R. Duncan, Martin J. Brennan, Shawn P. Colborg, Jerry Wayne Crow, Jolene Davenport, Leroy G. Duran, Edward Allen Finley, Bryan Green, George H. Hoskison, Ann R. Kirk-Schweitzer, Marianne Maestas, Michael Moore, Maryla Aleksandra Olszewska-Wasiolek, Jake Daniel Sena, Lorenz Spangler, Alison Winstead

Integrated Micro Primary Atomic Clock Technology (IMPACT) Team

The IMPACT team successfully transitioned to Phase III of the DARPA IMPACT program by meeting the challenging performance milestones with their trapped ion atomic clock.

Team members: Kent M. Geib, Victoria Sanchez, Yuan-Yu Jau, Ronald P. Manginell, Adrian Robert Wagner, Komandoor Achyuthan, John Moses Anderson, Peter Schwindt, Matthew W. Moorman, Gregory M. Peake, Darwin K. Serkland, David R. Wheeler, Thomas Bauer, Adrian L. Casias, Roy H. Olsson, Kenneth Wojciechowski

Investigation of Ultra-Fast Closure Valve (UFCV) Performance on Z-Machine

The UFCV Z-Machine investigation team determined the cause of explosive bond failures for critical hardware that prevents serious system contamination on critical Z experiments.

Team members: Lisa Anne Deibler, Alice C. Kilgo, Donald F. Susan, Bonnie B. McKenzie, Thomas B. Crenshaw, David G. Moore, Ciji L. Nelson, Kevin D. Rolfe, Peter Eric Wakeland

MC4682 Gel-Mylar Dual Capacitor Code Blue Recovery Leadership Team

100 staff from 18 centers, working with our KCP and NNSA partners, successfully recovered from the MC4682 Gel Mylar Dual Capacitor Code Blue emergency.

Team members: Gordon J. Roubik, Bruce D. Fishel, Lauren Marie Cleavall, Gerald A. Gurule, Stacey Durham Medina, Mike Gannon, Jerome A. Rejent, Joanna Lewis, Jeremy A. Walraven, Danelle M. Tanner, Luke Henry Wyatt, Lucas Edward Shiver, Mark R. Platzbecker, Don Lifke, Tracy C. Peterson, David Lee Williams, Larry A. Andrews, Howard W. Arris, Lothar F. Bieg, Saied Esfahani, Adam H. Lester, Susan Pollard-Walker, William Rhinehart, Kyle R. Thompson, William Wilbanks

Quantum Computer Aided Design (QCAD) LDRD Team

For the development of CAD design and analysis software that accelerates the experimental development of quantum dot-based qubits and nanoelectronics.

Team members: Richard P. Muller, Xujiao Gao, Ralph W. Young, Andrew G. Salinger, Erik Nielsen, Irina Kalashnikova

Thermal Battery Code Integration Team

For building a trust-based synergistic relationship between multidisciplinary physics development and Sierra code teams to build capability in prediction of thermal battery performance.

Team members: David Alan Barringer, Harry K. Moffat, Anne Grillet, Lisa Ann Mondy, Christine Cardinal Roberts, Edward S. Piekos, Kevin Nicholas Long, Victor Brunini, Scott Alan Roberts, John C. Hewson, Lindsey Gloe Hughes, David Ingersoll, Kyran D. Mish, Nicholas D. Streeter, Daniel Edward Wesolowski

Division 2000

Discreet Oculus PCS-Field Team

The PCS-Field team has successfully developed, tested, delivered, and deployed four complete systems under an extremely tight schedule.

Team members: Sean Patrick Hollister, Kathy Pehrson, Raymond Anthony Sand, Carlos Gutierrez Lopez, Mark A. Gonzales, Chris Castle, Lonnie Diehl, Matthew S. Geuss, Dayne C. Myers, Jason P. Krein, Asael Halvorsen Sorensen, Jonathan Roger Van Houten, Ethan Blansett, Melvin Lamar Bennett, Daniel E. Gallegos, Joshua Jacob, Thomas L. Lindgren

Flame Spray Problem Solving Team

The team redesigned the flame spray exhaust system to eliminate a potential combustible/deflagration hazard, achieving facility resumption without impacting neutron generator directive schedule.

Team members: M. Anthony Chavez, Julie V. Cordero, Jeffrey S. Downs, Steven J. Lockwood, Edward F. Astle, Aaron C. Hall, Richard D. Elliott

Neutron Generator (NG) Loss of Bias Problem Solving Team

The team utilized a Structured Problem Solving Methodology to successfully eliminate a product failure phenomenon and resume neutron generator operations without jeopardizing directive schedules.

Team members: Kathleen C. Johns, Adrian C. Romero, Mark S. Poiles, Keith W. Meredith, Laura L. Halbleib, Jamie Michael Kropka, Gary A. Pressly, James Selander, John P. Lopez, Roger H. Moore, Randolph Herrick, Edward F. Astle, Charles A. Bertram, Tearie Buie, Juan M. Elizondo-Decanini, Loren I. Espada, Joseph Sean Howard, David G. Moore, Matthew Neidigk, John B. Stephens, Kyle R. Thompson, Jessica S. Weems

(Continued on next page)


Amalie Frischknecht
1814


Julia Ann Garner
4848


Mark Gerling
8132


Kimberly Hallatt
10508


Meredith Haney
9544


Oscar Hernandez
5952


Rossitza Homan
6814

(Continued from preceding page)

Sandia's Distributed & Embedded Firing System and Explosive Train Development Team

For rapid-response development of the first-of-a-kind distributed, high-explosive embedded, survivable firing system and its deployment to a fielded asset of national importance.

Team members: Adrian Robert Wagner, Andrew McCants Sr., Peter S. Duran, Chad Hettler, Matthew S. Geuss, Adrian L. Casias, Aaron D. Hamburger, Patrick D. O'Malley, Aaron M. Ison, Melvin Lamar Bennett, Darren Wang, Christopher Colburn, Eric James Couphos, Evan C. Dudley, Curtis L. Gibson, Ryan P. Haggerty, Benjamin Hanks, Cody Wade Love, Lloyd Douglas Mitchell, Matthew Neidigk, Jerome T. Norris, Michael O. Romero, James D. Schreiber, Spencer Hamilton Steel, Adam Wadin

The UP1643 Power Module Development Team

For dedication and technical excellence in the development and delivery of the UP1643 Power Module in support of the Use Control Code Management System (CMS).

Team members: Kevin Schmidt, Theresa Elena Cordova, Gi Gi G. Gonzales, Mike Majedi, Carla Jane Weatherred, Aaron T. Murray, Ryland Lloyd Hubka, R. Reed Jackson Jr., David W. Cocain, Stephen Weaver, Thomas H. Brewer, Jerome S. Cap, Pauline Chavez, David J. Gelet, Joseph R. Hurtado, Mark Jursich, Benjamin Kemp, Curtis James Marshall, Kyla Martinez, Michael McLean, Hazel S. Rodriguez, Bryan M. Sanchez, Robert Anthony Sanks, Rudy Chavez Sedillo, Etta Tsosie

W62 JTG Team

The W62 JTG Team solved a unique and complex technical issue to successfully enable shipment and transfer of the legacy W62 JTG Trainer.

Team members: Mark A. Greenslete, Raymond Griego, Lacey Learson, Tina Stetson, Roger S. Tilley, Robert Mark McConkie, Cynthia I. Kajder, Daniel J. Hardin, Brian Keith Kinler, Robert James Morrison III

W87 Energetic Components

The Explosive Technologies Group (ETG) successfully designed, developed, and delivered the MC4872 Detonator and MC4804 Timer for use in the W87 Small Ferroelectric Neutron Generator.

Team members: Matthew Farrow, M. Kathleen Alam, Laura E. Martin, Lori Montano-Martinez, Daniel P. McCarthy, James D. Schreiber, Raymond Carey, Thomas M. Massis, Taryn Willey Garcia, William K. Shelton, Roger W. Kite, Richard Elliott Apodaca, Rachel L. Carlson, Stephen Curtis Chrisman, David Lee Damm, Evan C. Dudley, Heather Finkner, Anthony Louis Garcia, Everett Hafenrichter, Clifford L. Howard, Frank Hung, Katie Elizabeth Mabey, David S. MacKenzie

W87 MC3730 Detonator Significant Finding Investigation Team

For evaluations of the W87 MC3730 detonator critical to the US nuclear deterrent.

Team members: Lori Montano-Martinez, Linda Kay Jones, Laura E. Martin, George Bachand, M. Kathleen Alam, Melody Teixeira, Peter J. Hotchkiss, Neil R. Sorensen, Joe Bainbridge, Matthew Farrow, Rachel L. Carlson, Everett Hafenrichter, Laura L. Halbleib, Thomas M. Massis, James A. Ohlhausen, Robin Ohlhausen, M. Barry Ritchey, Cole Joseph Valancius, Adam Wadin, David R. Wheeler, Polly H. Wilks

W88 ALT 370 System/AF&F Team

For recognition of engineering excellence in the completion of the Phase 6.2/2A study for the W88 ALT 370 program.

Team members: Jennifer F. Gilbride, Marla M. Pohl, Ying Liang, Melissa Jessica Prieto, Sharon T. Del Prete, David Barr, Debra Ann Tabor, Georgia Artery, Scott E. Slezak, Stacey Tran Glass, Heather R. Kraemer, Arthur V. Houghton, Anthony John Radler, Jim J. Locklin, Danny L. Thomas, Sharon L. Trauth, Irene R. Kolb, Ephraim R. Arquitola, Jennifer S. Franklin, Edward A. James, Jeffrey A. Robinson, Jeffrey Ernest Salzbrenner, Robert Shepherd, Glen A. Smith, Joseph T. Wharton

Weapon Evaluation Test Laboratory Surveillance Team

The WETL Surveillance team overcame many obstacles and completed a large amount of testing that provided their customers with needed data for Annual Assessment Review.

Team members: Brandon Hill, Steven G. Spinhirne, Thomas J. Hieb, Mark Watkins, Ernest Cherbak, Michael Phelan, Wendell Keith Clements, Frank D. Love, Jason Cochran, Larry J. Kuykendall, Brian Seldon Gowdy, Stephen Artho, Edilverto Fuentes, Gary D. Jones, Rene Ramirez, Rhonda Lea Fraser, Katrina Luna, Linda F. Hubbart, Nicole Olcott, Derrick Vanegas

Division 3000

Sandia Digital Publication Library iPad App Team

Sandia's first publicly available Digital Publication Library iPad app, which features Sandia Perspectives, is brought to life by Sandia's Creative Services team.

Team members: Sue Major Holmes, Robert B. McInteer, Bill Murphy, Lainee Marisa Goldman, Douglas Gene Prout, Thomas M. Wubbels, Michael P. Vittitow, Christi A. Forsythe, Darrick Hurst, Randy J. Montoya, Marianne Nancy Salem, Melissa Anne Tucker

Sandia Wounded Warrior Career Development

For exceptional service in creating a successful career program for combat related wounded warriors.

Team members: Linda Jaramillo-Alfaro, Cindy Lovato-Farmer, Jody Thomas, Sue Medeiros, Evelyn Cortez, James Peery, Michael Kline, Raymond Parks, Ronald Farmer, H. E. Walter, Benjamin Anderson, Richard James Alexander, Benjamin K. Cook, Esther S. Hernandez, John A. Larson, Fredrick M. McCrory, Kathy Robertson, Karen L. Shanklin

Division 4000

858 Complex 2012 Winter Shutdown Electrical Team

For teaming to complete a very complex electrical winter shutdown to perform critical preventative/corrective maintenance and system upgrades, including 20 electrical outages for Buildings 858N/858EF.

Team members: Donald B. Campbell, Russel K. Matheson, Charles Lynn Tomlin, Greg C. Kirsch, Philip C. Pelzman, Andrew A. Ashbacher, Thomas E. Boothe, Gary W. Bultmann, Clark H. Davis, Roland W. Deaton, Paul A. DeLara, Gregg Gardner, Roy E. Gideon II, Herman Gomez, Steve F. Goodrich, Rodney Jefferey Griego, Joseph P. Hancock, Leroy Andrew James, Tommy Jewell, Sean Rager, Lucille M. Roybal, Richard E. Simmons, William J. Tierney, Johnny Anthony Urioste, Eugene M. Wade

Halon Discharge Post-Incident Inquiry Team

The Halon post incident inquiry was an investigative centerpiece. Completion time and technical accuracy were uncompromised principles applauded by Sandia and The Department of Energy.

Team members: Nora E. Campbell-Domme, John L. Cerutti Jr., Julie V. Cordero, Ralph Fevig, Michael Gutierrez, Anthony G. Chavez, Darrell G. Fong, Kent L. Robbins, Donald F. Susan, Carlos Mario Alba, Tanja Michelle Fitzgerald, Kenneth W. Gwinn, Derrick Futoshi Alika Higa, Jonathan Murray

LiveSafe Team

The LiveSafe website was launched during the spring of 2012 and is a resource for broadening awareness of safe behaviors for work and home.

Team members: Lynda N. Innis, Karen N. Armstrong, Katrina Marie Wagner, George B. St.Clair

Molten Salt Test Loops Project Team

For completing the Molten Salt Test Loops Project, a one-of-a-kind facility, on schedule and within budget.

Team members: Marvin Mark Roybal, Erika Barraza, Christine N. Riddle, Alex D. Riebli, Christopher Ryan Mckean, David Dennis Gill, Scott F. Rowland, William J. Kolb, Kye Martin Chisman, John W. Kelton, Daniel A. Ray, Troy Rogers, Ernest Armand Trujillo

SEC150 Security Briefing Delivery Team

The team enhanced Sandia's security culture and image by effective delivery of the newly improved SEC150 security briefing.

Team members: Alina R. Bloom, R. Paul Keller, Stephanie Lynn Anderson, Charles J. E. Montoya, Laurie Bergemann, David A. Furbush, Tim Deshler

Security Connection Core Team

The Security Connection Core Team spent over five months, half time, on time-intensive tasks needed to stand up the Security Connection call center.

Team members: Vanessa Michelle Petty, Tiffany Jo Mayfield, Charles J. E. Montoya, Tim Deshler, Carlos Mario Alba

SNL/NM Waste Diversion and Recycling Team

SNL/NM Waste Diversion and Recycling team achieved ongoing success, exceeding the Corporate Environmental Management System target of 65% recycling, winning two Best in Class awards.

Team members: Ralph J. Wrons, Charlene B. Argo, Craig J. Wood, Pamela Catanach, Pamela E. Mincey, Joshua B. Konetzni, Charles Daniel Palacio, Patrick Wells Dotson, Andrew Gough, Douglas W. Vetter, Chris J. Romero, Samuel A. McCord, Victor Barba, Erika Barraza, Chuckie Crawley, Anna Torres-Atencio

Division 5000

Air-to-Ground Hydra Vision Team

For the development of revolutionary new combat identification and sensor cross-cueing capabilities to enhance threat detection and processing in a complex, dynamic battlespace.

Team members: John Richards, Ireena A. Erteza, Brian K. Bray, Melissa Linae Koudelka, Travis Burkhard, Mark W. Koch, Jason Wertz

Capitan Team

For exceptional synergy and impact across short-, medium-, and long-term goals in advancing the acquisition of critical imagery in a national mission.

Team members: Amy J. Shrouf, Tu-Thach Quach, Kurt W. Larson, Brandon R. Rohrer, Hyrum Anderson, Jason W. Wheeler

Copperhead Improvised Explosive Device (IED) Detection Team

The team has successfully delivered and supported Copperhead improvised explosive device detection systems that have dramatically reduced the number of US troop casualties in theater.

Team members: Michelle Chavez, Jeffrey D. Bradley, Jennifer L. London, Jay D. Jordan, Kristina Benn Kominek, John T. Fuller, Bryan L. Burns, William H. Hensley Jr., Gary K. Froehlich, Peter E. Sholander, Scott Nance, Douglas Thompson, Robert Riley, Adam R. Tanuz, Henry John Coakley, William R. Escapule, Emmett J. Gurule, Philip M. Kahle, Darrell L. Kirby, Dale Lipke, Lee H. Marshall, Molly McCandless, James W. Redel, Grant J. Sander, Kathie Woods

Counter-Electronics High Power Microwave Advanced Missile Program (CHAMP) Team

The team provided exceptional customer support and technical achievement in developing the nation's first weaponized High Power Microwave system in conjunction with AFRL.

Team members: Jeffery Thomas Williams, Guillermo M. Loubriel, Larry Martin Lucero, Joshua M. Usher, Phillip D. Coleman, Jason Shelton, Jeff A. Alexander, Paul Primm, Howard W. Arris, Fernando Bitsie, Gary J. Denison, Steven B. Dron, William H. Greenwood, David Joseph Gurule, Burke Lloyd Kernen, Enrico C. Quintana, Grace E. Santillanes, Eric Carl Stasiunas, Kyle R. Thompson, David L. Zamora

ECHO System Development Team

The ECHO System Development Team successfully developed and delivered a life-saving system to protect our Nation's Crown Jewel Soldiers.

Team members: Cory W. Ottesen, Stephanie L. Otts, Ryan R. Halle, Adam J. Umpleby, Randy Elton Smith, Michael R. Striker, Matthew Montano

ICADS Build 6 Deployment Team

For outstanding dedication to excellence in achieving all Air Force acceptance milestones for the deployment of ICADS Build 6.

Team members: Meifan Chen, Stefani E. Olcott, Diana Jackson, Michael Wayne Johnson, Phyllis Garcia, Loren Jayne, Kuan Chen, Glyn Evans, Craig Crowder, Timothy J. Spears, Paul J. Attermeier, Patrick DeMoss, Suzanne Dove, Peter Karl Espen, Stephen K. Fries, Jeremy Goold, Richard J. Kominek, Randolph A. McWilliams, Steven B. Spahr, Jenifer Frances Zinner

ICADS Build 6 Development Team

For the successful development, testing, deployment, and handover of the first delivery of ICADS Build 6 to the Air Force customer.

Team members: Linda K. Shepard, Melicia Proctor, Iyiin Chang, Richard J. Kominek, In K. McCann, Phillip Garcia, William J. Proctor

LE-Riptide QR Core Team

For on-time, on-performance delivery, under budget with significant national security impact on the rapid-fire Quick Reaction projects that Sandia was tasked with during March through September 2012.

Team members: Harold Ortiz, George S. Greer, Luis Obando, Edward A. Henry, Etta Tsosie, Jerry D. Strother, Christopher G. Mirate, Arnoldo Muyshondt, Steven B. Rohde, James Carroll, John Cates, David A. Wiegandt, Stephen F. Kuehn, Arlen P. Weishuhn, Ronald E. Kidner, Michael P. Beede, Clinton R. Bitzer, Scott W. Hammond, Robert O. Hanzlik, Vernon Adry Nichols, Jason R. Podgorski, David Smythe

OxyClean

For perseverance, teamwork, and delivery of a technical result of high importance to the customer on a high impact system utilizing multiple capabilities.

Team members: Emily A. Mitchell, Tiffany A. Pierce, Jennifer Trasti

(Continued on next page)


Conrad James
1714


Edward S. Jimenez
9515


Robert Koss
2211


Robert Lovejoy
1753


In McCann
5636


Jeremy Michaels
4826


Melissa Miller
10264


David Osborn
8353


Jakob Ostien
8256


Anthony Perlinski
5336


Jane Poppenger
5746


Harry Pratt
2546


Sandhya P. Rajan
1631


Jeffrey Rienstra
5719


Michael P. Saavedra
1832


Sally Samora
1728


Dianne S. Sanchez
10245


Cody Steele
10242


Samuel Subia
1541

(Continued from preceding page)

PT

For high impact research and development resulting in a novel tool that solves previously unsolvable problems and vastly reduces the solution time for solvable problems.

Team members: Nasser J. Salim, Chris L. Leger, Timothy James Loffredo, Benjamin David McBride, Josh Eads, Denis Bueno, David Burton, Jonathan David Cooke, Nancy A. Durgin, Brian Gaines, Michelle A. Leger, Danny Loffredo

Royal Blacksmith

For exceptional efforts to model, build, test, and assess objects of high national security importance.

Team members: Leah W. Tuttle, Thomas J. Hafenrichter, Rudy J. Navarro, Benjamin B. Valdez, Dante M. Berry, Jose H. Saloio Jr., David Nichols, Mark R. Nissen, Brian J. Schwaner, Cynthia L. Boyd, Edward Bystrom, Rachel L. Carlson, Brian P. Cass, Matthew Heine, Brian K. Holliday, Charles Jensen, Karmen Noel Lappo, Laura E. Martin, Amarante Martinez, Thomas M. Massis, Bryant R. Morgan, Shawn Michael Parks, Bridget J. Serna

SB-TAC

The team assessed effects of spoofing attacks on infrastructure and established effective countermeasures using a low cost atomic clock to verify timing validity.

Team members: Chris P. Tigges, Patricia M. Medsker, Kevin Nichols, Justin R. Ford, David K. Novick, Benjamin Mar, Abraham Anthony Clements, Vincent M. Hietala, Jason E. Stamp, Charles Laverty, WesLee James Frisby, Joshua Ryan Templin, Jordan M. Henry, Derek H. Hart, Stephen K. Marley, Jason Millard, Bryan T. Richardson, Owen J. Yaklin

Synthetic Aperture Radar (SAR) Patterns of Life (POL) Algorithms Team

The SAR POL life team developed innovative exploitation algorithms and human analysis understanding important for high performance ISR missions.

Team members: Laura A. McNamara, Ana Martinez, Nina Chen, Roger Derek West, Ivan Lizarraga, David Nikolaus Perkins, Laura E. Matzen, Matthew Strosnick, Katherine M. Simonson, David A. Torgesen, Kristina Rodriguez Czuchlewski, Michael Joseph Haass, Peter E. Sholander

TP2 On-Site Team

For outstanding performance running critical tests to characterize/optimize our system — working long hours at the test facility — assuring mission success for our program.

Team members: Patrick S. Barney, Richard D. Wickstrom, Rebecka Renfro McSloy, Adam Brewer, Miranda Elizabeth Buckman, Michael Grow, Eric A. Shields, David E. Bodette, Ralph G. Keyser, Michael C. Lenz, Theodore J. Kim, David Godsey, Jose Rodriguez, Glen A. Ankenman, James Bronder, Brenda Byrd, John Morasco, Patrick Mullen, Michael S. Pacheco, Kayla Marie Smith, Bernard E. Soules, Rosemary Villanueva Studenny, Timothy Walsh, Gary L. Whitlow, Frank Young

Division 6000

Chain of Custody (CoC) Field Evaluations Team

The CoC Team created a national test bed for evaluating potential arms control technology, developed and evaluated an integrated monitoring system, and tested additional technologies.

Team members: Katherine Dorothy Tremba, Nicholas Medina, Sharon M. Deland, Regina M. Griego, Grace E. Thompson, Justin Charles Fernandez, Larry A. Bruskas, Alvaro Augusto Cruz-Cabrera, Jay Kristoffer Brotz, Ross W. Hymel, Geoffrey Ethan Forden, Thomas M. Weber, Christopher W. Wilson, Connie Bodmer, Michael Coram, Linda Holle, Alfred Earl Johnson, Gene A. Kallenbach, Larry D. Miller, Ronald Hideo Mori, Mark R. Nissen, Raymond F. Prior Jr., Kevin D. Seager, Maikael A. Thomas, Manuel M. Trujillo

Oliktok Point, Alaska: Instrumented Balloon and Unmanned Aerial Systems Flight Team

This team successfully completed the first flights of small unmanned aerial systems at Oliktok Point in November 2012, overcoming significant challenges and setting important precedence.

Team members: Roberta A. Gonzales, Jeffrey A. Zirzow, Daniel A. Lucero, Gerald L. Peace, Frederick M. Helsel, Jasper O. E. Hardesty, Larry Yellowhorse, Anthony Wallace Jenkins, Valerie Sparks, Stephen Warner, Robert N. Cook III, Darin Maurice Desilets.

PDC Bit Demonstration Team for Hard-Rock Geothermal Drilling in the Chocolate Mountains

The team negotiated numerous procurement and technical hurdles to successfully demonstrate the application of polycrystalline diamond compact bits in a hard-rock geothermal environment.

Team members: Carolyn David, David W. Raymond, Jiann-Cherng Su, Dennis K. King, Steven D. Knudsen

PWR Nuclear Fuel Assembly Fire Test

Successful completion of the design and conduct of the NRC/OECD sponsored PWR Nuclear Fuel Assembly Fire Test.

Team members: Greg John Koenig, Mollye C. Wilson, Samuel Durbin, Robert Wauneka, Shane Michael Adee, Eric R. Lindgren


Jerilyn Timlin
8622


Henry Westrich
7910

Secure Transportation Asset Tests (STAT)

For exceptional teamwork and execution in conducting a complex, time-critical, and high visibility test series that has widespread national security ramifications.

Team members: Gerald L. Clark II, Luis Hernandez, Jason Schneider, Thomas Reecer, Jason Wilke, Karmen Noel Lappo, Edward G. Rankin, John W. Hatley, Titus James Appel, Kevin Jay Jameson, Chad E. Hjorth, Quentin Kramer, Robert P. Cutler, Matthew Thompson, Steven A. Silva, Timothy L. Brown, Douglas J. Ammerman, Charles D. Hedrick, Matthew Heine, Guy L. Jones, Kurt E. Metzinger, William D. Morse, Jerry C. Powell Jr., Stephen N. Sanderson, Danny Williams

Supercritical Carbon Dioxide Brayton Laboratory Team

Exceptional teamwork in establishing an internationally recognized laboratory for the development and demonstration of high efficiency Brayton cycles.

Team members: Alma F. Gonzalez, Matthew David Carlson, James Jay Pasch, Leann Mays, Angela O. Dyke, Glenn Paul Cannon, Darryn Fleming, Gary Rochau, Thomas M. Conboy, Robin Arthur Sharpe, Matthew Cattaneo, Debbie S. Chavez Garcia, Lyman Wes Chilton, Carolyn David, Nicholas A. Durand, Thomas R. Gallegos, Sarah Hannigan, Robert C. Moore, Sylvia J. Saltzstein, Mollye C. Wilson

The Development of Decontamination Technologies for Use in Critical Infrastructure

For development of the best available decontamination technologies and deployment methods that rapidly mitigate hazards following release of highly toxic chemical warfare agents.

Team members: Lysle M. Serna, Rita Betty, Danielle Rivera, Andres L. Sanchez, Mark D. Tucker, Amy Allen, Stephen W. Howell, Patricia S. Sawyer, Todd M. Alam, Curtis D. Mowry, Gretchen S. Taggart, Daniel A. Lucero, Robert Bernstein, Joshua Allen Hubbard, Michael A. Martinez, Brandon Lee Servantes

Unmanned Aerial Systems Team

The Unmanned Aerial Systems (UAS) team demonstrated exceptional dedication, persistence, and cross-laboratory cooperation to establish a new testing and development capability for the Labs.

Team members: Gerald J. Langwell, Joshua Alan Love, Wendy A. Amai, Daniel E. Small, David K. Novick, Austin Philip Heermann, Stephen Warner, George V. Sanzero.

Division 8000

B83 System Integration Test Team for the ELNG, MC4535 SNL2 Explosive Test

Evaluate the performance of the new MC4535 Electronic Neutron Generator (ELNG) in a high-fidelity configuration to verify compatibility with the full explosive environment.

Team members: Stephan Lee King-Monroe, John M. Van Scyoc, Jolene R. Gilbert, April Nissen, LeRoy L. Whinnery Jr., Gabriel A. Lopez-Diaz, Young Min Ahn, Steven A. Neely, Barry M. McLaughlin, Jerry Inman, Michael Heinz, Kelley Garcia, Danny Rey, Jose T. Vigil, Frank R. Trowbridge, Ronald Carr, Seung J. Choi, Robert J. Dankiewicz, Stephen Eisenbies, John E. Friddle, Brian K. Holliday, Vipul Mistry, Bryant R. Morgan, Donald A. Sheaffer Jr., Christy L. Turner

BioWatch Biodetection Architecture Analysis Team

High-impact analysis of next-generation bio-detection requirements for the Department of Homeland Security that was widely recognized as critical to informing a major Category 1 acquisition.

Team members: Nathaniel J. Gleason, Nerayo P. Teclemariam, Scott M. Paap, Garrett Barter, Julia A. Fruetel, Marilyn F. Hawley

California Site Family and Friends Day 2012 Team

Sandia Family Day enabled more than 1000 Sandians, contractors, and their families/friends to visit the California site to learn about our mission and programs.

Team members: Kathleen Lynn Moody, Stephanie Beasly, John Paulson, Herman O. Armijo Jr., Dennis L. Baker, Nicholas John Charnichko, Lisa Anne Gray Corcoran, Morgan Edwinson, Laurie J. Farren, Jennifer Kovacs, Robert J. Mariano, Jessica Matto, Dorrance E. McLean

Foundation Bus Design Analysis Team

For performing a formal mathematical analysis of the Foundation Bus, which yielded design improvements to greatly increase its safety and reliability

Team members: John Hector Solis, Ratish Punnoose, Akshat Kumar, Joseph Ruthruff, Robert Armstrong, Jacques Kvam, Gerald Boyd

W80 ALT 937 Shipping Plug Deployment

For overcoming many barriers and a compressed schedule, and completing the required safety evaluations and reviews with NNSA/DoD to have the shipping plug successfully deployed.

Team members: Heather K. Schriner, Tina Stetson, Susan Whitney Lacy, Matthew Ritchie Sneddon, Nathanael L. Lyon, Robert D. Waters, Kimball O. Merewether, Alfred A. Ver Berkmoes, Randall A. Van Cleave, Joseph Paz, David Counsil, Jerrod Peterson, Barbara Anne Yerganian, Jenny Whitacre Brewer, Kevin E. Carbiener, Martin K. Fuentes, Mark A. Hanna, Robert L. Kinzel, Arlene M. Lucero, Kevin J. Maloney, Paul Mendes, Thomas M. Souther, Fern Vaughn

Division 9000

9500 Wind Turbine Reliability Modeling Team

For modeling multivariate indicators to maximize precision in identifying impending Wind Turbine equipment failure.

Team members: Arthur Joel Machtinger, Tu-Toan Quach, Terry Wayne Spaulding, Jeremy Burton Myers

Cost Estimating Tool Development Team 1

The Cost Estimating Tool Development Team created a new corporate estimating tool in support of the new corporate estimating policies in a rapid timeframe.

Team members: Jason T. Follingstad, Lindsey Paige Wareham, Paula J. Jernigan, Judi A. Doolittle, Joseph Patrick Carney, Stephen Vender, Joshua David Skousen, Marin A. Noriega, Marie C. Gendreau, Hue D. Lai, Patrick Joseph Wing

ESN Release 8 Team

For exceptional dedication and teamwork in the design, development, and deployment of Release 8 of the Enterprise Secure Network (ESN).

Team members: Ricardo Urioste, David G. Heckart, Roberto Rodriguez, Patricia Malecki, Thomas A. Feeney, Joseph P. Brenkosh, Damon Gerhardt, C. Douglas Brown, Edith V. Johnson, Timothy L. MacAlpine, Randolph Abeyta, Michael K. Bencoe, Shari L. Garcia, Richard D. Gay, Dennis R. Tenorio

In-Situ Visualization Team

The In-Situ Visualization team developed and demonstrated a novel computational analysis paradigm that enables higher fidelity results and is an important step toward exascale computing.

Team members: Patricia Crossno, Kenneth D. Moreland, Warren L. Hunt, Jeffrey A. Mauldin, Thomas Jay Otahal, Nathan D. Fabian, David B. Karelitz, Timothy Shead

Division 10000

Conference Management Implementation Team

Standing up conference management tools and processes allowing Sandians to be approved for event attendance in compliance with new DOE requirements.

Team members: Scott Olson, Natalie Mona Chiha, Candice Montoya, Patricia F. Hebert, Kelly E. Westlake, Todd P. Dunivan, Cheryn K. Lingerfelt

New Mexico Gross Receipts Tax (NMGRT) Phase 1

For reviewing NMGRT liability for FY2012, reducing tax liability by $6.6M, and establishing a baseline that will be leveraged to achieve additional tax savings.

Team members: Kathleen Galbraith, Nikki R. Lobato, Ross Wimborne, Carol Joy Blanch, Heather J. Christ, Richard Sweeney, Waylon B. Ferguson Jr., Leland J. Clise, Zachary Lee De Gregorio, Elizabeth Helene Adams, Suzanne Boehland

PMART/PCUBE Business Intelligence Team

The team delivered a state of the art self-service business intelligence tool that significantly enhances data accuracy, analysis, and reporting for Sandia Corporation.

Team members: Cindy Fulcher, Joanna Baczek, Lee Derks, Lindsey Paige Wareham, Jana D. Lichlyter, Ralph L. Chapman, Joshua David Skousen, Marie A. Myszkier, Richard R. Baird, Jayson Lane

Resource Management Process (RMP) Tool Team

For exceptional teamwork and leadership in proactively developing and implementing a robust tool and consistent process for Divisions and Centers completing the Resource Management Process.

Team members: Christine T. Cooper, Richard W. McLendon, Fabian N. Aragon, R. Duff Lill

Retro Rates

Establish new process to manage indirect rates and communicate process changes and impacts throughout the Labs.

Team members: Laura A. Owens, Leland J. Clise, Laurel Jean Taylor, Carla Moncayo, Victoria Griego Stanley, Yvonne Petrova, Doris J. DeSimone, Carol L. Ferguson, Jennifer Gonzales, Mario A. Pino, Waylon B. Ferguson Jr., John R. Moleres, Brian Kirk Snyder, Michael K. Widmer, Richard W. McLendon, Matthew David Plummer, Kim P. Gallagher, Marialuisa L. Arnold, Sharon Ann Chino, Sonya Ann Hackbarth

Webshipper 2.0 Development Team

Development of a state-of- the-art integrated shipping system to improve efficiency and reduce risk for laboratory shipments.

Team members: Shannon R. Letourneau, Daryl M. Stephens, Connie S. Chocas, Melissa K. Miller, Cindy Fulcher, Lacey Learson, Debbie June Finfrock, Lorenz Spangler, Shawn P. Colborg, Richard M. Scarine, Trevor La Pay, Jack Euske, Steven Farmer, Michael Ray Hernandez, Anthony L. Leyba, Lisa D. Milmine, Grace C. Miranda, Henrietta Muller, Lenore A. Partridge, James C. Prestwood, Robert Preston Rivera, Sandra Lynn Ryan, Gregory Valdez, Laura J. Whittet, Brian R. Zaik

Division 11000

Legal Support Team for DOJ v. BP Deepwater Horizon

Outstanding legal support of the United States Department of Justice lawsuit against British Petroleum and other companies due to the 2010 Deepwater Horizon oil spill.

Team members: Sheila L. Pounds, David J. Borns, Anne K. Chavez, Kathleen T. Hurst, Joyce A. Lesperance, Barbara M. Lucero, Barbara R. Glasco, Jean A. Plummer, Marianne Hill, Douglas A. Blankenship, Arthur C. Ratzel, Corey S. Reitz, Patricia Sanchez, Troy Robert DeVries, Ronald C. Dykhuizen, Charles Morrow, Marjorie L. Tatro


Gregory L. Wickstrom
2141


Jerome L. Wright
6814

Mileposts

***New Mexico** photos by Michelle Fleming*

Bob Patton
35 2555

Ralph Candelaria
30 4844

Marjorie McCornack
30 6923

Bonnie Apodaca
25 10000

Howard Kimberly
25 5515

Charlie Robino
25 1831

Mike Cahoon
20 9310

Becky Campbell
20 10662

Linda Carrillo
20 10586

Wu-Ching Cheng
20 1384

Richard Crotwell
20 4842

Jon Custer
20 1111

Harry Gullett
20 232

Carla Jean Lamb
20 4826

Carol Michaels
20 2913

Evelyn Serna
20 10610

Peter Swift
20 6220

Thomas Vieth
20 6812

Bob Waters
20 432

John Ball Jr.
15 5541

Sally Bangora
15 3655

Jim Fernandez
15 9548

Rudy Garcia
15 5554

Heidi Herrera
15 1679

Brian Post
15 5513

Dolores Sanchez
15 2714

Kevin Stamber
15 6132

Robert Trujillo
15 414

Danny Turpin
15 5946

David Wackerbarth
15 5357

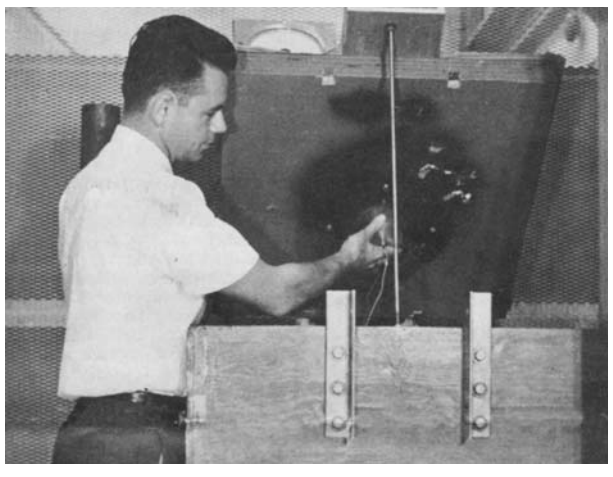
***The content here is taken directly from back issues of the* Lab News.**

60 years ago . . . Sandia Corporation's new President, James W. McRae, assumed his new duties in the Laboratory. He succeeds Donald A. Quarles who resigned to accept the post of Assistant Secretary of Defense in charge of Research and Development. Mr. McRae has been with the Bell Telephone Laboratories since 1937.

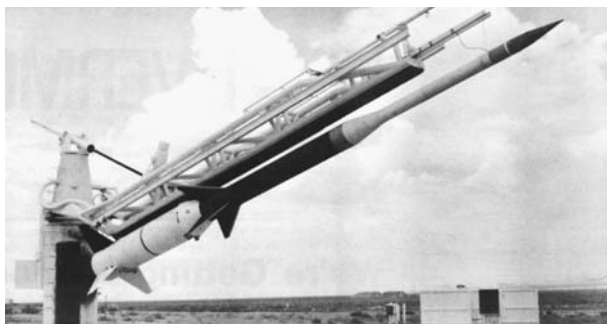
JAMES W. McRAE

50 years ago . . . Advanced technology can already produce thin film circuitry, resistors, and capacitors — microscopic, intricate and inherently reliable. The interest at **Sandia Laboratory is to produce thin film active devices to substitute for transistors and conventional components.** These would be compatible with thin film circuitry. It is hoped that by this method thin film devices can be made smaller and more temperature-resistant than conventional devices.

With the development of a revolutionary new shock testing facility at Livermore Laboratory, engineers may soon be able to "dial" the force they need to test a component, and attain results within an accuracy of 5 percent. The new shock testing machine makes use of magnetic "pressure" to propel test components with the force of a cannon. Still in the prototype stage, the facility can transform electromagnetic energy into a mechanical force sufficient to apply more than 50,000 pounds of force and 30,000 g's on a two pound specimen. In some tests, an acceleration as high as 100,000 g's has been produced.



MAGNETIC SHOCK FACILITY is readied for test at Livermore Laboratory by Tom Meagher, co-designer of the unique device.



TATER — A three-stage rocket system developed by Sandia achieved a velocity of 10,700 feet per second in the heavy atmosphere under 11,000 feet.

40 years ago . . . At Tonopah Test Range, a 40-ft. long, pencil shaped rocket streaked low across the horizon and set a number of records of sorts. The three-stage rocket system, a team effort of Aerodynamics Project Dept. 5620, achieved a velocity of 10,700 feet per second in the heavy atmosphere below 11,000 feet. The vehicle experienced extreme temperatures and the thermal protective coatings were almost totally consumed by the flight, but the 65-lb. payload riding behind the graphite nosecone survived and was recovered. Sandia is running a continuing program of materials research on missile nosecones for the Air Force.

Albuquerque's Veterans Heading Home gets $20,000 boost from Lockheed Martin on behalf of Sandia Labs

By Stephanie Hobby

Veterans returning home should be given a hero's welcome, but for too many, the reality is a much different picture. On behalf of Sandia, Lockheed Martin Corporation recently donated $20,000 to Veterans Heading Home, part of the city of Albuquerque's initiative to make homelessness rare, short-lived, and non-recurring. The goal is to provide permanent, supportive housing solutions to veterans and their families at risk for homelessness. The initial focus of the project is on female veterans, and will provide housing and offer assistance with employment, behavioral health, transportation, and child care.

At a press conference to announce the new program on Thursday, Aug. 15, Sandia VP and veteran Mike Hazen (4000) and Sarah Renfro (0810), also a veteran, presented a check to Albuquerque Mayor Richard Berry to fund the first $20,000 of the new program. Organizers expect other funding sources to provide an additional $80,000 to complement Sandia's seed money.

Veterans Heading Home is an offshoot of the city's Albuquerque Heading Home program, which the mayor launched two years ago with the help of $20,000 from Lockheed Martin on behalf of Sandia. The goal was to house 100 of the city's most vulnerable, chronically homeless people. Since that time, the program has successfully housed more than 200 people and has had an 84 percent success rate in maintaining people in homes. A similar model will be used to address the needs of homeless veterans.

A HELPING HAND — Sandia Div. 4000 VP and veteran Mike Hazen, left, and Sarah Renfro (0810), also a veteran, present a check to Albuquerque Mayor Richard Berry to support the Veterans Heading Home program, which is designed to provide permanent, supportive housing solutions to veterans and their families who are at risk for homelessness. At right is Albuquerque Heading Home CEO Dennis Plummer.

(Photo by Norm Johnson)

From mimeographs to Lync

43-year veteran instructor teaches his last Sandia class

By Tim Deshler

Around 1970, Sam Stearns was teaching a digital signal processing (DSP) course at the University of New Mexico when he was asked to create a specialized course for Sandia. He began teaching the course as a consultant and continued teaching it as an employee when he joined Sandia's math department in 1971. Last June, Sam, now a retired Sandian and consultant, taught his final DSP class at Sandia. He taught the course at Sandia for more than 43 years.

Sam says that what he loves about teaching is that,

SAM STEARNS

"When you teach others, you're giving them something of yourself, and you know people are going to take it and do something you've never dreamed of with it. It's an investment that is sure to pay dividends."

Writing texts

Sam wrote his first DSP textbook in the early 1970s, eventually publishing it in 1975, with an introduction written by mathematician Richard Hamming. Sam credits Sandia with providing a great deal of support for the project. He says the process of writing a textbook was much more labor-intensive back then. Secretaries transcribed his handwritten manuscripts on typewriters, and he used mimeographed copies of draft chapters as handouts for his course at the time.

"It was a great way to get the book reviewed," Sam says. "And students appreciated having something written to refer to."

In 1985, Sam published *Adaptive Signal Processing* with Bernard Widrow at Stanford. That book is still in print. Sam has written several texts since then, including *Digital Signal Processing with Examples in Matlab* in 2003, and, with Don Hush at Los Alamos National Laboratory, a second edition of the same text in 2011, which is currently used in the DSP course at Sandia. His textbooks have been translated into several languages and are used in many countries.

After retiring in 1996, Sam took a break from Sandia and consulted all over the country, developing and teaching several versions of an industrial DSP course. He taught short courses at the CIA in Langley, Va., at Lawrence Livermore National Laboratory in California, and elsewhere. Eventually, he came back to Sandia as a consultant, mainly to continue teaching DSP.

David Epp, one of Sam's former students, was working in modal analysis when he signed up for Sam's course. At the time, David was using Matlab software to analyze experimental data, which he says is essentially DSP with a narrower focus, and he became interested in the course because Sam used Matlab software to teach it.

"Sam's class gave me a greater understanding of the DSP field — a broader point of view about the technology I was using for work," he says.

Sam is impressed with the teaching technology now available at Sandia. When he started teaching, he used viewgraphs on transparencies and an overhead projector to present information to his students. In his final classes at Sandia, remote students participated in the class via Lync.

Sam says he's changed over his many years of teaching, but the students are basically the same. "They truly are the best and brightest," Sam says. "We hire the best." Some of his early students are now retired, and some have gone on to become well-known in their fields around the world.

Throughout his career, Sam has had an ongoing teaching relationship with UNM, and has supervised many graduate students there and elsewhere. He is now a professor emeritus at UNM. "I hope Sandia can continue a working relationship with UNM," Sam says, "because the benefits go both ways."

Engineers rarely leave college now without taking a DSP course, but there's still a lot of interest in Sam's class. "Some students who had DSP in college have some foundational knowledge of the subject, but find that they need to know more about it when they start work," he says. Sam has trained two instructors to continue his DSP course at Sandia. He says the best way to take the course is to have some practical way to use the knowledge right away.

Sandians teaching Sandians: ESEP offers engineering sciences courses

In 2005, the Engineering Sciences Education Program (ESEP) was developed in response to a Strategic Education Council request to reinvigorate the culture of learning at Sandia and to encourage the "Sandians teaching Sandians" strategy. The goal of the program is to meet the needs of the Engineering Sciences community and support employee professional and technical growth.

The program started with three courses and has since grown to 24, with nine new ones in FY14. The program targets those who support Engineering Sciences business objectives. Early participants were primarily from Centers 1500 and 8200, but now include a cross-section of the Labs population.

FY14 Course Offerings:

- ESP 99, Nano Heat Transfer
- ESP 100, Computational Mechanics with an Emphasis on Solid Mechanics
- ESP 500, Experimental Mechanics
- ESP 600, Computational Simulation –Thermal Analysis
- ESP 601, Computational Simulation – Structural Analysis
- ESP 602, Computational Simulation – Electrical
- ESP 603, Computational Simulation Transport and Effects Analysis
- ESP 604, Electromagnetic Effects
- ESP 606, NW Test Facilities Overview

Students can register for the courses in TEDS. For more information, contact Mia Logan (3521) at 505-284-7787 or Dan Rader (1513) at 505-844-0528.